Room Pressurization System (RPS)
RPx-xxx1-xxx
User Manual
ML 478

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Markings and Warnings

Required for Rooms in Hazardous Areas in accordance with IEC60079-13

Markings using equivalent text may be used.

The isolating switch shall be clearly marked:

**"WARNING – Run fan for *T* min before energizing the installation,
unless the atmosphere inside the room is known not to be hazardous."**

Where *T* is the minimum specified time to purge the room.

All doors to the pressurized room shall be clearly marked on the inside and the outside, by the following:

"WARNING – Pressurized room – Keep door closed"

Each infrequently used entrance to a room in a zone 2 area shall be marked to restrict access such as with the following:

"AUTHORIZED PERSONNEL ONLY"

An airlock shall be clearly marked with the following:

"WARNING – Verify other door is closed before opening this door"

Each entrance to a room where the protective gas is inert shall be clearly marked with the following:

"DANGER – Room does not contain breathable air and is an asphyxiation hazard"

Each entrance to a room where loss of pressurization could result in an alarm indicating an asphyxiation hazard from build-up of inert gas shall be clearly marked with the following:

**"DANGER – Do not enter when alarm sounds.
Room does not contain breathable air and is an asphyxiation hazard"**

Each entrance to a room where loss of pressurization could result in an alarm indicating an explosion hazard from build-up of flammable gas or vapours shall be clearly marked with the following:

**"DANGER – Do not enter when alarm sounds,
room contains a dangerous level of combustible gas and is an explosion hazard"**

1 System Specification

General Specification

Classification	For use in NEC 505 or ATEX Zone 2
System Marking	Ex nA nL nR [pz] IIB T4 Gc
Room Pressure	User adjustable via Flow potentiometer on User Interface Panel
Fan Capacity	1800cfm (3000 m^3/h) for Single door or up to 3000cfm (5100 m^3/h) for two 3' x 7' doors (0.91m x 2.13m)
Fan Type	ATEX Approved Backward Curved Centrifugal Ex II 2G c IIB T4
Fan Motor Type	ATEX Approved Induction Motor Ex II 2G e IIC T4
Pressurizer Control Enclosure	Restricted Breathing
RPS Mounting method	In-Room or Through-Wall
Temperature Limits	-20° C to + 40° C (-4° F to + 104°)
Supply Air	Ambient air (Or from remote source as required.)
RPS Weight	120kg (265 lb)
Sound Level	75dB(A) max at High Flow

Electrical Specification

System Supply Voltage	230 VAC nominal, limits are 180V to 264V, 1 Phase, 50/60 Hz
System Power Consumption	Less than 1.5 kW
Fan Motor Rating	3~230/400V D/Y 50Hz 1.1kW, 3.2/1.85A 1290 RPM
Outputs	Volt Free (Dry) contacts: 1A 250Vac AC1
Inputs	Optoisolated; activate either by mechanical switch or by NPN transistor. Maximum current: 10 mA.

Sensor Specification

Room Pressure Sensor	Differential diaphragm switch with gauge. Factory set point 25 Pa (0.1" w.c.)
High Flow Sensor	Differential diaphragm switch with 150 Pa (0.6" w.c.) rising set point.

Materials of Construction

System Enclosure	Polyester powder coated mild (carbon) steel

Indications and alarms

Indicators visible on the front panel of the unit *(See Figure 1, p6)*

System OK	System output: lamp indicator and Volt Free (Dry) output contacts
Pressure OK	System output: lamp indicator and Volt Free (Dry) output contacts
Pressure Alarm	System output: lamp indicator and Volt Free (Dry) output contacts
Forced Fan Shutdown	User input: input contacts and lamp indicator
Forced High Flow	User input: input contacts and lamp indicator

Users Volt Free Contacts

See drawing SD7833 for user terminal connection.

Volt Free Output Contacts	Volt Free (Dry) contact for Buzzer (Buzzer supplied by others) Expo recommended part: EBU-0000-013
	Pressure Alarm
	System OK

2 Quick User Guide

Installation

- Mount the Room Pressurization System (RPS) as per the General Arrangement drawing (SYS-M000-032-GA).
- Make Electrical connections as per applicable local Codes of Practice. Users Electrical hook up is shown in drawing SD7833
- Always ensure the system has been installed as per the full instructions in the section of the manual titled ‘Installation of the System’.

Operation of system

- Once installed correctly turn on the power supply. **It is important to note that when switching the unit off and on within a short period, the ‘System OK’ light will blink for 3 minutes after which the power may be recycled to start. This feature prevents damage to the frequency drive.**
- Adjust the flow on the User Interface Panel to achieve required room pressure as per information supplied in Start-Up Procedure

    - If the system has not worked as expected check the installation thoroughly.
    - Read the section in manual called “Operation of the System.”
    - If an obvious problem has not been highlighted and corrected then follow the checks in the section “Fault Finding”.
    - If the checks have been made and the system will still not work then please contact your local distributor or EXPO.

3 System Overview

Area Classification: NEC Class I Zone 2 or ATEX Zone 2 Category 3
Applicable Directives: Local Codes of Practice, NEC 505, NFPA 496, EN 60079-0 and IEC 60079-13 (draft)

The RPS generates a room pressure to prevent ingress of the external hazardous atmosphere.

- The design of the RPS allows it to operate in a classified area.

- The protective air is ambient air drawn from the rear of the RPS and it is the Users’ responsibility to ensure that the protective air is free from hazardous gasses. The RPS features mounting holes on the rear of the unit at the air intake to which ducting can be fixed.

System Description

Expo Room Pressurization System is designed for the following applications, but may not be limited to:

- Positively pressurize a room above atmospheric pressure.
- Provide an outward velocity through opened door(s).
- Prevent hazardous gas ingress from an external source.

- The RPS is a z-Type pressurizer, ‘pz’. The RPS measures the difference between the pressure in the room and the atmosphere outside the room. The user sets the low-flow on the unit via the Flow adjust control knob on the User Interface Panel to ensure that a positive room overpressure is maintained. The air intake to the RPS is potentially from a classified area and it is the responsibility of the User to ensure the air supply is free of hazardous gases.

Start-up procedure

1. Switch on the RPS with the Power disconnect switch on the User Interface Panel.
2. An automatic Lamp Test will take place, which will see all the indicators on the User Interface Panel lighting up briefly.
3. The RPS will require the Flow potentiometer on the User Interface Panel to be adjusted to the set point. The Pressure OK, Green Indicator shall remain illuminated. The Pressure Gauge shall be in the "Green Band" (above 25 Pa [0.1" w.c]). The User has 30 seconds in which to set the Flow (and thus desired pressure) to compensate for the individual room leakage rate. After 30 seconds High Flow will commence until room pressure is established.
4. Refer to Section 7 “Operation of the System: Commissioning” to ensure correct airflow as per Local Codes of Practice.

Normal operating conditions.

The following system operating characteristics are considered normal and any deviation should be fully investigated by referring to the ‘Fault Finding’ section:

1. The RPS (once set) will ensure that the room maintains an internal overpressure to prevent the ingress of the external atmosphere.

2. Should the RPS pressure drop below the pre-set threshold of 25 Pa (0.1” w.c.) (due to a door being opened or for any other reason), after a preset delay of 10 seconds (to allow personnel to enter and exit the Pressurized Room) the RPS will:

    a) Engage High-Flow to ensure an outward air velocity of 0.3m/s (60fpm) across the doorway

    b) After an additional 20 seconds: Indicate an alarm condition both locally (visual indicator) and, if connected by the user, by switch contact to remote location

    c) Indicate alarm status via volt free contact which is available for the user to connect an alarm buzzer or indicate the alarm at a remote location (see Electrical Termination Box drawing SD7833 for buzzer contacts.) When the pressure differential drops below the 25 Pa (0.1” w.c.) threshold, and the alarm contact is made, it can be silenced on the User Interface Panel by depressing the Alarm Silence button. This will not clear the alarm status or induce low flow, it only silences the buzzer.

3. The action to be taken on alarm is to be determined by the owner in accordance with his risk assessment.

4. When the pressure is restored in the Room (e.g. by closing the door) the RPS will reduce the flow rate to the low level again and the alarm will clear.

5. The RPS features volt free input contacts which the user can use to Force Shutdown or Force High Flow. The breaking or making of these contacts will change the illumination status of the corresponding indicator's on the User Interface Panel (see Electrical Termination Box drawing SD7833)

System Running Conditions and Alarm Status.

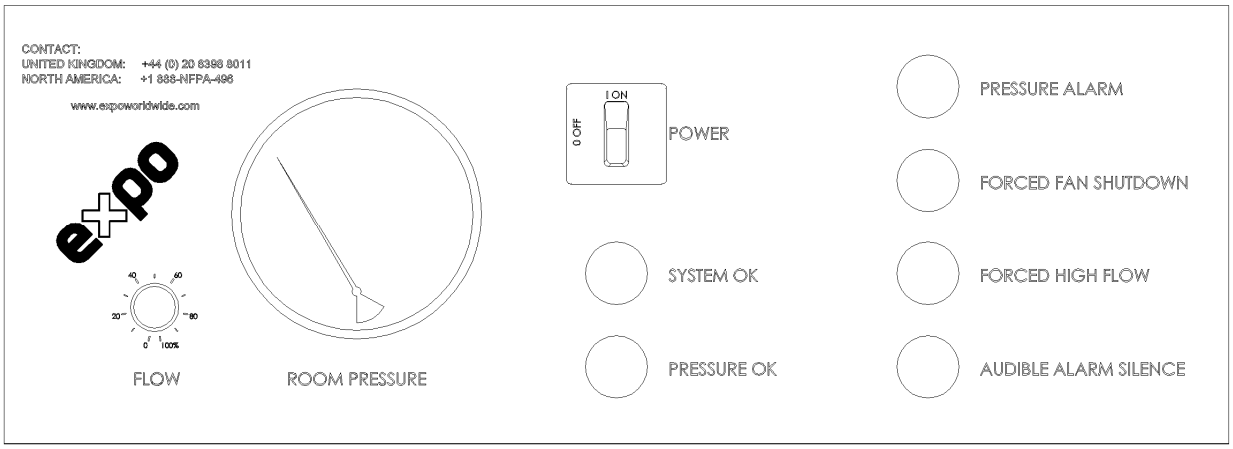


Figure 1 (The User Interface Panel)

Normal Running: i.e. *Flow setting is sufficient to maintain room pressure, the fan will run in low-flow mode and the following will occur:*

- The System OK and Pressure OK indicator will be illuminated.

High Flow Running: i.e. *A door has been open for more than 10 seconds or the flow setting is insufficient to maintain enough pressure to overcome room leakage or any other reason that would result in a loss of room overpressure for longer than 10 seconds, The high-flow mode will engage and the following will occur:*

- The System OK indicator will remain illuminated, The Pressure OK indicator will no longer be illuminated and the Pressure Alarm indicator will illuminate. The Pressure Alarm volt free contact will close and the External Buzzer volt free contact will close, unless silenced via Audible Alarm Silence button on User Interface Panel. The Audible Alarm Silence feature only overrides the External Buzzer contact. It does not affect the Pressure OK and Pressure Alarm indicators, nor does it affect the remote Pressure Alarm contact.

High Flow is maintained until the room overpressure is reestablished, at which time the System will revert to normal running conditions (i.e. low flow).

Fan/System Failure: i.e. *There is a failure to achieve sufficient flow through the unit due to any reason like a blocked filter, restriction in ducting, fan failure, faulty flow switch, electrical control failure etc.*

- The System OK indicator will no longer be illuminated and the System OK volt free output contact will go open circuit.

Forced Fan Shutdown: *i.e. An external hazardous gas is detected at the inlet, mechanical damage is observed etc.*

- The user can connect an external volt fee input contact to the unit as per the Electrical Termination Box drawing SD7833. When the external input is open circuit the corresponding indicator on the User Interface Panel will illuminate. When this contact is not used a link within the Electrical Termination Box must be used

Forced High Flow: *i.e. An internal hazardous gas is detected in the room, additional ventilation is required etc.*

- The user can connect an external volt fee input contact to the unit as per the Electrical Termination Box drawing SD7833. When the external input is closed the corresponding indicator on the User Interface Panel will illuminate.

4 Application Suitability

This version is designed for use in a Zone 2 classified environment. The RPS is designed to pressurize the interior of a room by introducing ambient air. This equipment is designed for use under normal industrial conditions of ambient temperature, humidity and vibration. Please consult Expo before installing this equipment in conditions that may cause stresses beyond normal industrial conditions.

Materials of construction:

• Stainless Steel	• Nylon
• Mild (carbon) Steel	• Polyurethane
• Brass	• Acrylic
• Aluminum	• Silicone Rubber
• Bronze	• Neoprene
• EPDM	• Epoxy

5 Understanding the main components

The Filter
The RPS is designed to provide particle-free ambient air to the room. The air is drawn in to the rear of the enclosure and then filtered through a fine filter with a G4 classification and a MERV 8 rating.

The Fan Unit
The RPS uses an ATEX rated aluminium impeller and induction fan motor unit approved for use in hazardous areas.

Inlet Stack
Fresh air is drawn in from outside the room. All flanges and joints shall be sealed and free of leaks and inlet stack or ducting shall be protected against foreseeable mechanical damage. The source of air shall be determined from the nature of the process and physical layout and shall not normally be from a classified location. Applicable Standards and local Codes of Practice shall be adhered to. Inlet tubing must be equal or greater than 350mm or 13.8” in diameter or equivalent rectangular area. **For user supplied stack or ducting longer than 3m (9.8’) and/or with more than one bend, consult Expo to ensure ability to provide sufficient flow is not impaired.**

Room Pressure Switch
To prevent spurious alarms, a factory-set delay is programmed into the System Control Unit. When the room overpressure drops to below 25 Pa (0.1” w.c.) and remains below for 10 seconds, the System Control Unit (SCU) initiates high flow and will remain in this state until Room Pressure has reestablished. The users’ volt free contacts for the Pressure Alarm and Buzzer remain unchanged during the 10 second delay.

Flow Sensor
The RPS is fitted with a differential diaphragm type pressure switch which is set to alarm if the RPS does not reach the correct pressure inside the RPS enclosure when high flow is engaged. This will indicate a fan flow failure. Should the fan fail or a lack of flow cause the switch to alarm, the System OK indicator will no longer be illuminated and the System OK volt free contact will go open circuit.

The System Control Enclosure
The System Control Unit (SCU) is housed within this enclosure. The System Control Enclosure is located inside the RPS enclosure. **The enclosure contains no user serviceable components**. Opening the enclosure may invalidate the certificate and should only be opened by trained Expo service engineers.
Routine testing may be required to ensure the sealing integrity of the restricted breathing enclosure has not been compromised. A test port is provided for this purpose. Routine testing frequency is determined by the Users' operating procedures and should consider operating environment, thermal cycling, exposure etc. For routine testing the procedure shall be in accordance with the current applicable standard for restricted breathing.

Currently the test is prescribed as follows:

- Using the test port provided, induce a vacuum in the enclosure of 300 Pa below atmospheric. Seal the test port tube.
- The enclosure shall still hold at least 270 Pa below atmospheric after 14 seconds. Ensure test equipment is absolutely leak free.

Where restricted breathing test fails, consult Expo.

6 Installation of the System

Room Pressurization System (RPS)

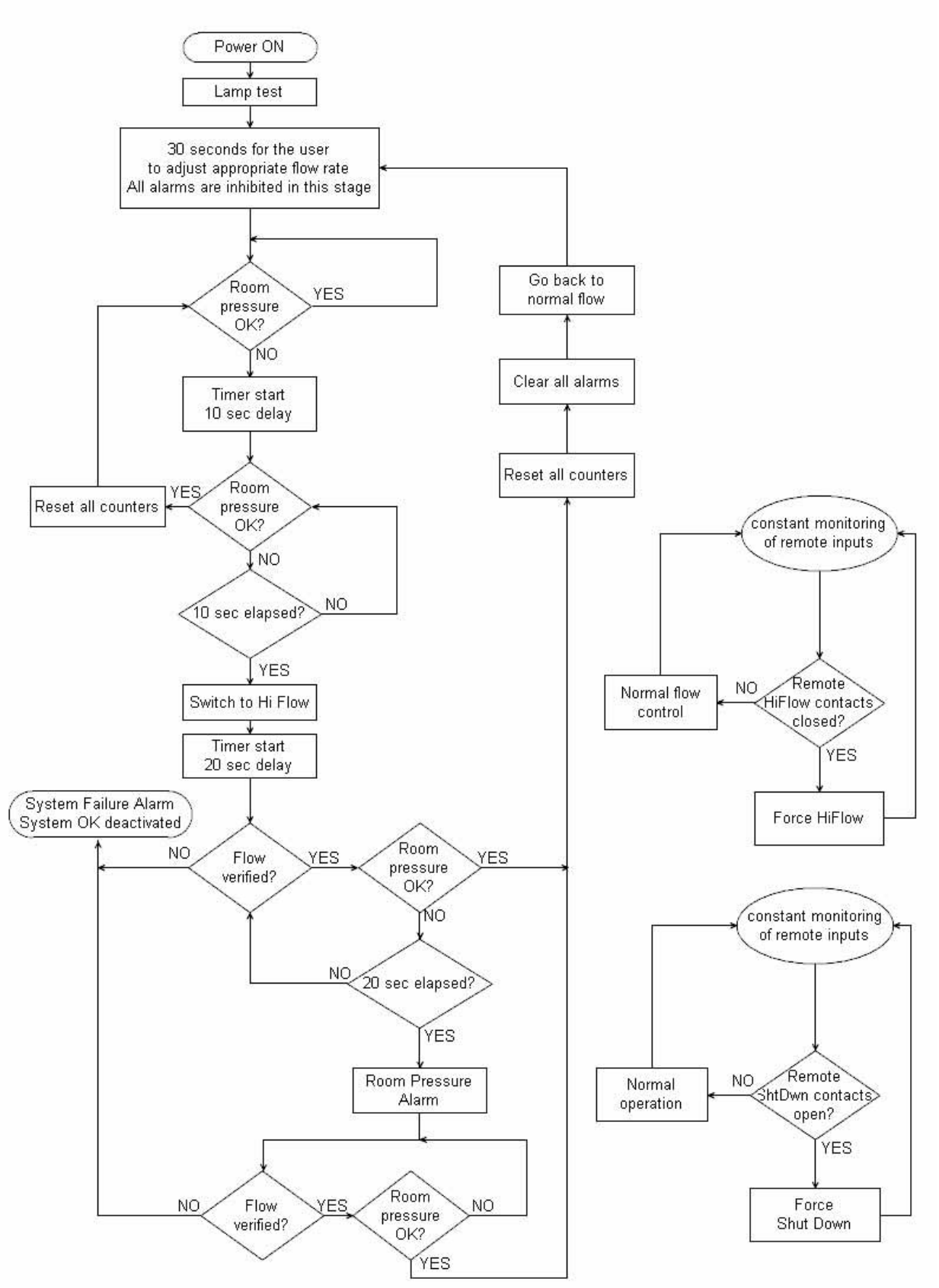
The RPS must be fitted to the room using suitable fasteners and the supplied support brackets where required. There are two methods of fitting the unit: In-Room and Through-Wall mount. The unit is supplied with a removable fixing frame and fixing points for both methods. For Through-Wall the default fixing frame position is shown on the General Arrangement drawing SYS-M000-032-GA.

As per common engineering practice, the room wall should be sufficiently strengthened and sufficient thread engagement is to be provided in the strengthened room wall structure. **When mounted, care should be taken where shock loading could occur during transportation**. Suitable measures should be in place to mitigate any adverse affects caused by shock loading on the RPS including all internal components. **Failure to adhere to the aforementioned guidelines may result in failures or damages falling beyond the scope of the manufacturers guarantee.**

Ensure that inlet ducting or stack flanges and joints are sealed and free of leaks and are protected against foreseeable mechanical damage. Inlet tubing must be equal or greater than 350mm or 13.8" in diameter or equivalent rectangular area. Refer to drawing SYS-M000-032-GA for inlet connection bushing for 1 door system and SYS-M000-035-GA for 2 door system. **For user supplied stack or ducting longer than 3m (9.8') and/or with more than one bend, consult Expo to ensure ability to provide sufficient flow is not impaired.**

When mechanical installation is complete, the Users' electrical connections are made by opening the hinged front door to access the Electrical Termination Box. The Power Disconnect Switch must be in the 'Off' position, and the door fasteners must be removed. The conduit/cable entry bushes at the front of the enclosure are threaded 3/4" NPT(F) for the user to fit hard conduit and/or cable glands (refer to drawing SYS-M000-032-GA). **A minimum IP54 seal is required at conduit/ cable entries and suitable glands or conduit stopper box's shall be used. Unused entries shall be blanked with suitable blanking plugs.** The user must then carry out electrical terminations as required per drawing SD7833 where recommended conductor sizes are found. Screws should be tightened to a setting of 0.5 N.m.
On completion the user is to replace the Electrical Termination Box lid and RPS door ensuring that all screws are in place and are sufficiently tightened.

7 Operation of the RP System



Initial Commissioning

- Refer to ‘Installation of the System’ and ensure the system has been installed correctly.
- Ensure the filter is clean and in position and filter access covers are securely in place.
- The RPS door and all other removable covers are closed properly.

Commissioning (Putting into use)

- Ensure all installation requirements are met.
- Ensure all openings (doors, gland plates etc.) to the Room which is being pressurized are shut.
- Apply the appropriate power to the system
- Switch Power on at User Interface Panel. **It is important to note that when switching the unit off and on within a short period, the ‘System OK’ light will blink for 3 minutes after which the power may be recycled to start. This feature prevents damage to the frequency drive.**
- Adjust the Flow potentiometer on the User Interface Panel until the Pressure Gauge needle is in the ‘Green Band’ (above 25 Pa [0.1" w.c]) and the green ‘Pressure OK’ indicator is illuminated.
- After Start-up the User has 30 seconds in which to set the Flow (and thus desired pressure) to compensate for the individual room leakage rate. After 30 seconds, if the Room Pressure is below 25 Pa [0.1" w.c] High Flow will commence. When room pressure is established, the RPS will resume Low Flow.

To ensure correct clean airflow as per Local Codes of Practice:

- With the Room Pressure set around 50 Pa, slowly turn the Flow adjust knob counterclockwise until the pressure is just above 25 Pa. *This step must be performed on a falling pressure.*
- Allow the flow to stabilize for a minute.
- Read off the Room Pressure from the gauge and the Fan Speed in ‘%’ on the Flow adjuster knob by rounding down to the next lowest increment i.e. if on 54 % use 50 %.
- On Graph XGR-PTD0-xxx **(use correct graph for 1 or 2 door system)**, draw a horizontal line at the Room Pressure set above i.e. 26 Pa. Where this line intersects the corresponding Fan Speed curve set above (i.e. 50% curve) draw a vertical line down and read off the Flow rate on the horizontal axis.
- To increase/ decrease the Flow rate at a desired Room Pressure, the rate of room leakage can be altered e.g. higher room leakage will require higher flow to pressurize the room to the desired level. The room leakage rate may be altered by adjusting the overall sealing quality of the room i.e. entry apertures, gland plates, door seals etc.

Provided the system has been installed correctly and the initial system checks described in the previous section have been performed, the system is now ready for continuous use with little or no user input or maintenance required.

8 Maintenance of the system

The maintenance recommended for the system is as follows, supplemented by any additional local requirements imposed by the local Code of Practice.
Expo recommends that the following checks are undertaken regularly:

Part	Frequency	Procedure
Filter	1 months (minimum) inspection with 6 month replacement frequency or more often as required depending on the degree of pollution.	Ensure RPS is off. Open a filter access panel on either side of the RPS. Replace the filter and ensure all access panel seating surfaces and gasketing is free from sand/dirt. Ensure filter is in correct flow orientation (see flow direction marking on filter). Replace access panels and ensure that they are properly secured.
Indicator's	Regular checking as per Users' maintenance plan	Switch RPS off for 3 minutes and switch RPS on again, visually inspect that ALL indicator's on User Interface Panel illuminate for 3 seconds during automatic Indicator Test at startup.
Fan & motor assembly	At least every 6 months or upon signs of wear or more frequently per Users' maintenance plan.	The fan motor is equipped with bearings with 'lifetime lubrication' and requires no maintenance. At least every 2 years the motor winding insulation resistance should be measured and should be above 1.5MOhm. Upon signs of wear or 35 000h a bearing exchange is required. Take note of any abnormal operating noise or vibration. Fan motor maintenance may only be carried out by the fan manufacturer.
Fan impeller	Regular inspection per Users' maintenance plan depending on the degree of pollution.	Always ensure the system is isolated and fan is stationary. Inspect impeller blades for dirt and pollution build-up. Clean impeller with a damp cloth only. Do not use any aggressive or solvent cleaners.
Restricted breathing enclosure	Routine checking as per Users' maintenance plan	For more detail, refer to Section 5: The System Control Enclosure

9 Fault Finding

If the system does not behave in the manner described in any of the above there is a fault. Some of the more likely faults are dealt with below. If a cure cannot be affected by following the procedure shown below please call Expo or your distributor for further assistance.

Symptom	Possible Fault	Resolution
System does not start up	• There is no power to the system	• Check that appropriate power is applied to the system
	• Internal fuse may have blown	• Consult Expo
System OK light blinks continually	• 3 minute 'Power On' has not elapsed, refer to Operation of the System	• After 3 minutes, recycle the Power i.e. Switch Off then On once
Fan keeps failing	• Flow sensor fault	• Replace loose pneumatics tube or faulty sensor (consult Expo)
	• Motor or impeller damage causes flow to drop off	• Investigate fan motor for any visual obstructions or damage. (Consult Expo)
Room Pressure alarm keeps coming on ***or*** system stays in High Flow	• Excessive room leakage or Flow too low	• Ensure room is airtight Or Increase setting on Flow adjust knob.
System stays in low flow	• Faulty room pressure sensor	• Consult Expo
	• Faulty variable speed drive	• Consult Expo
An indicator does not illuminate during Indicator Test	• Loose wiring connection to indicator contact	• Reconnect Wiring
	• Faulty indicator	• Replace damaged indicator

10 Recommended Spares List

Part	Description	Expo part number
Filter	Replaceable G4 filter	HF1-A000-004
Fan Motor Assembly	Motor and fan impeller assembly	AGE-GE00-134
Red Indicator	User Interface Panel Indicator	ELA-D000-013
Green Indicator	User Interface Panel Indicator	ELA-D000-014
Alarm Silence Pushbutton	Ø22 Black Pushbutton	MBU-Z000-006
Room Pressure Gauge	Pressure Gauge & Switch, factory set at 25 Pa (0.1" w.c) falling	HGA-0000-055
Fan High Flow Sensor	Differential Diaphragm pressure switch, factory set at 150 Pa (0.6" w.c.) rising.	ESW-0PS0-008
Flow Adjust potentiometer	Panel mount 10K single turn potentiometer	ERE-DMK0-10K
Front grille	Aluminium air inlet grille	MLV-D000-000

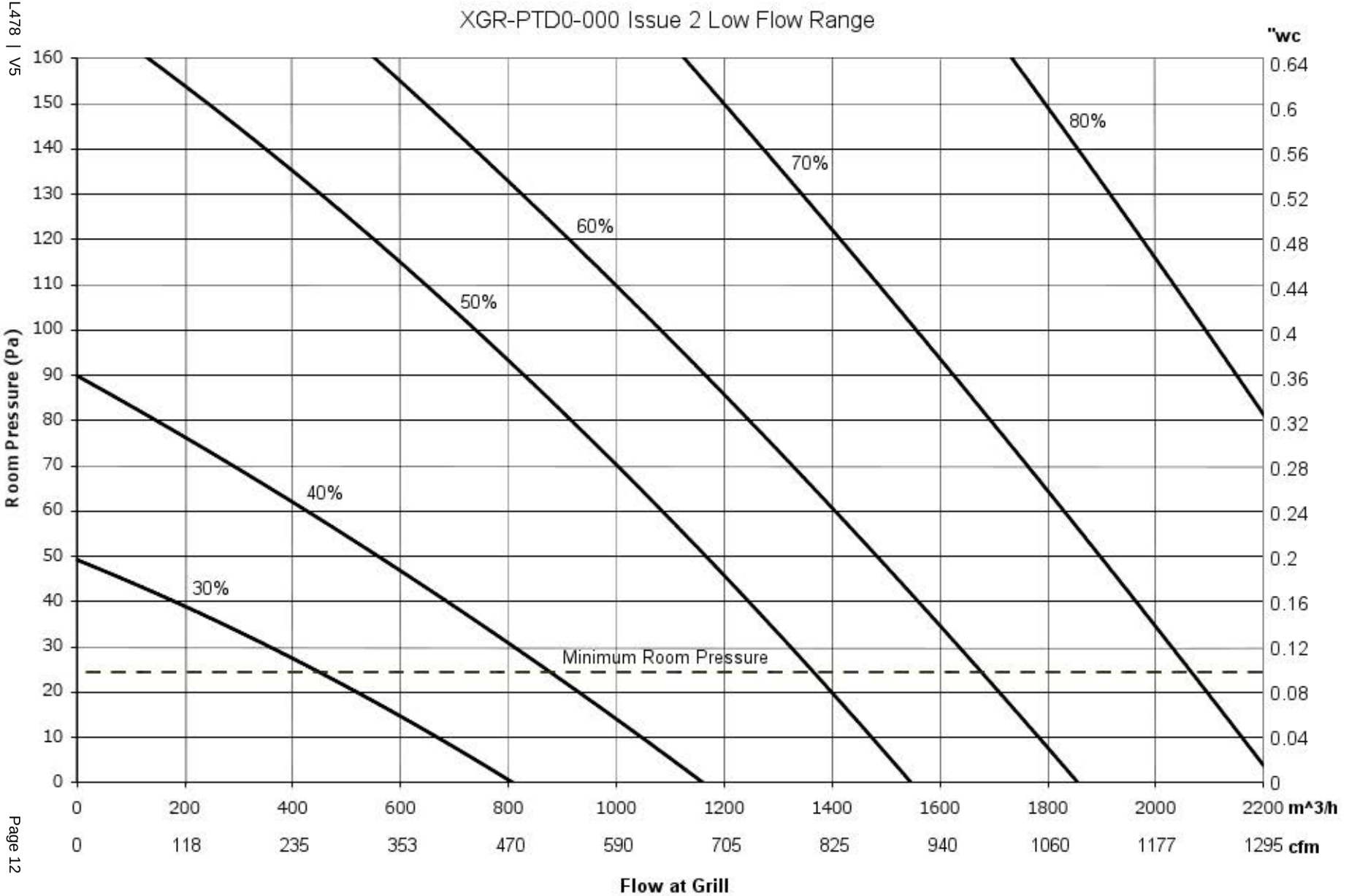
For all other parts or faults, locate applicable identification tag and consult Expo to discuss appropriate action.

11 Drawings and Diagrams

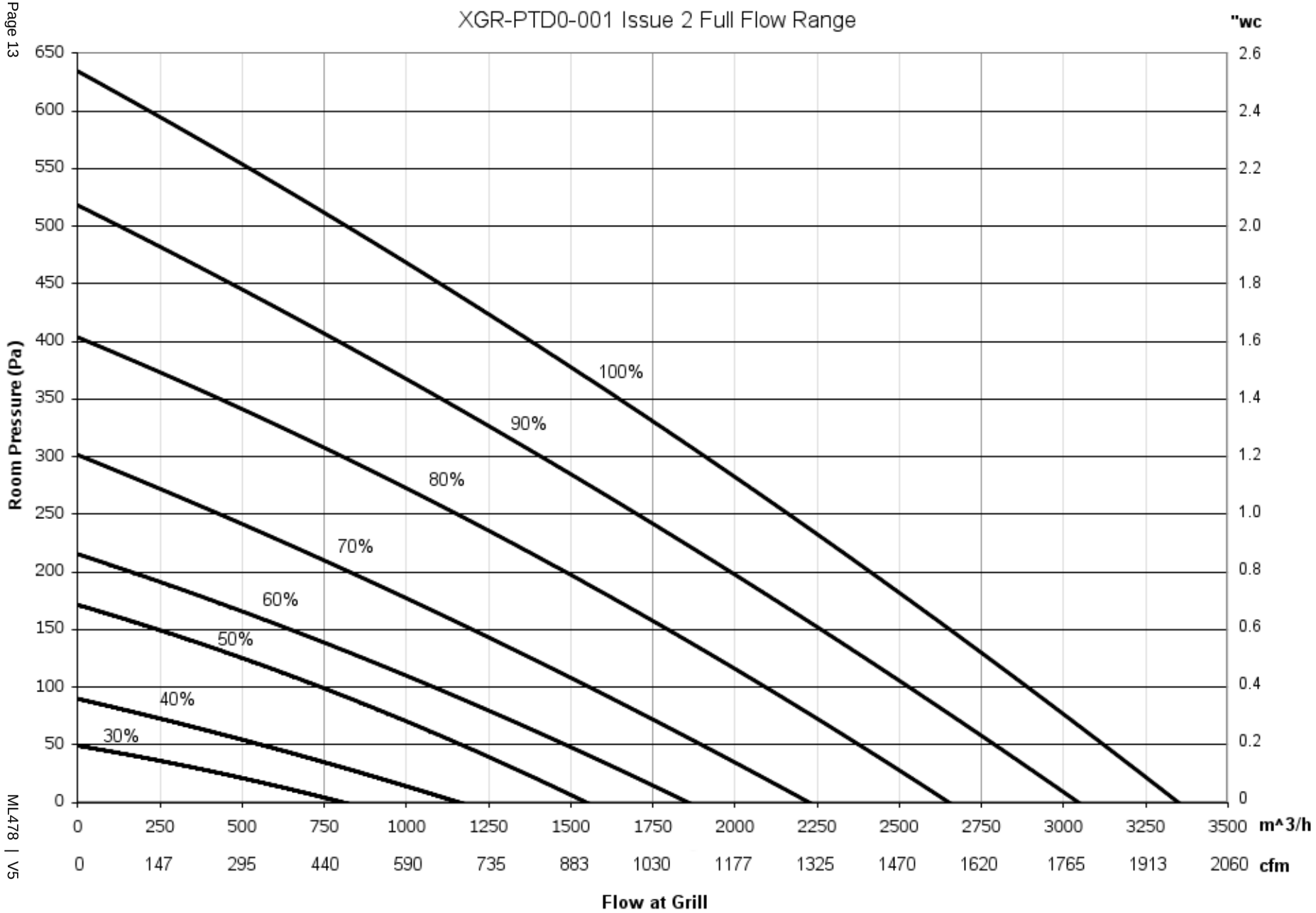
The following drawings are attached:

Title	Drawing Number	Sheet(s)
1 Door System Low Flow Range	XGR-PTD0-000	1 of 1
1 Door System Full Flow Range	XGR-PTD0-001	1 of 1
2 Door System Low Flow Range	XGR-PTD0-002	1 of 1
2 Door System Full Flow Range	XGR-PTD0-003	1 of 1
1 Door Room Pressurizer General Assembly	SYS-M000-032	3 of 3
2 Door Room Pressurizer General Assembly	SYS-M000-035	2 of 2
Electrical Termination Box	SD7833	1 of 1
Terminal Box Label	MLA-PAP0-062	1 of 1
Fire and Smoke Damper Label (where fitted)	Figure.3	1 of 1

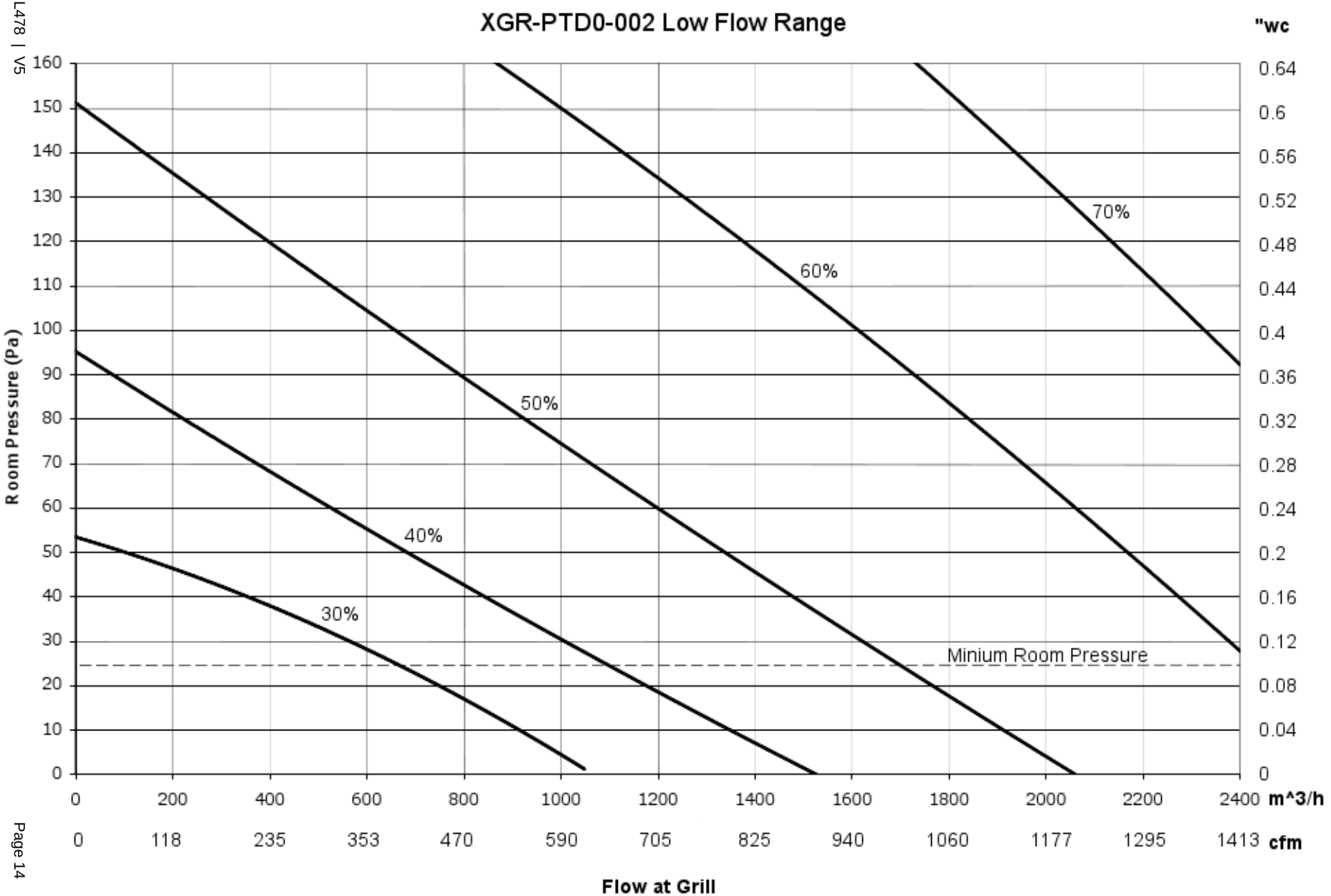
Room Pressurizer Flow



Room Pressurizer Flow

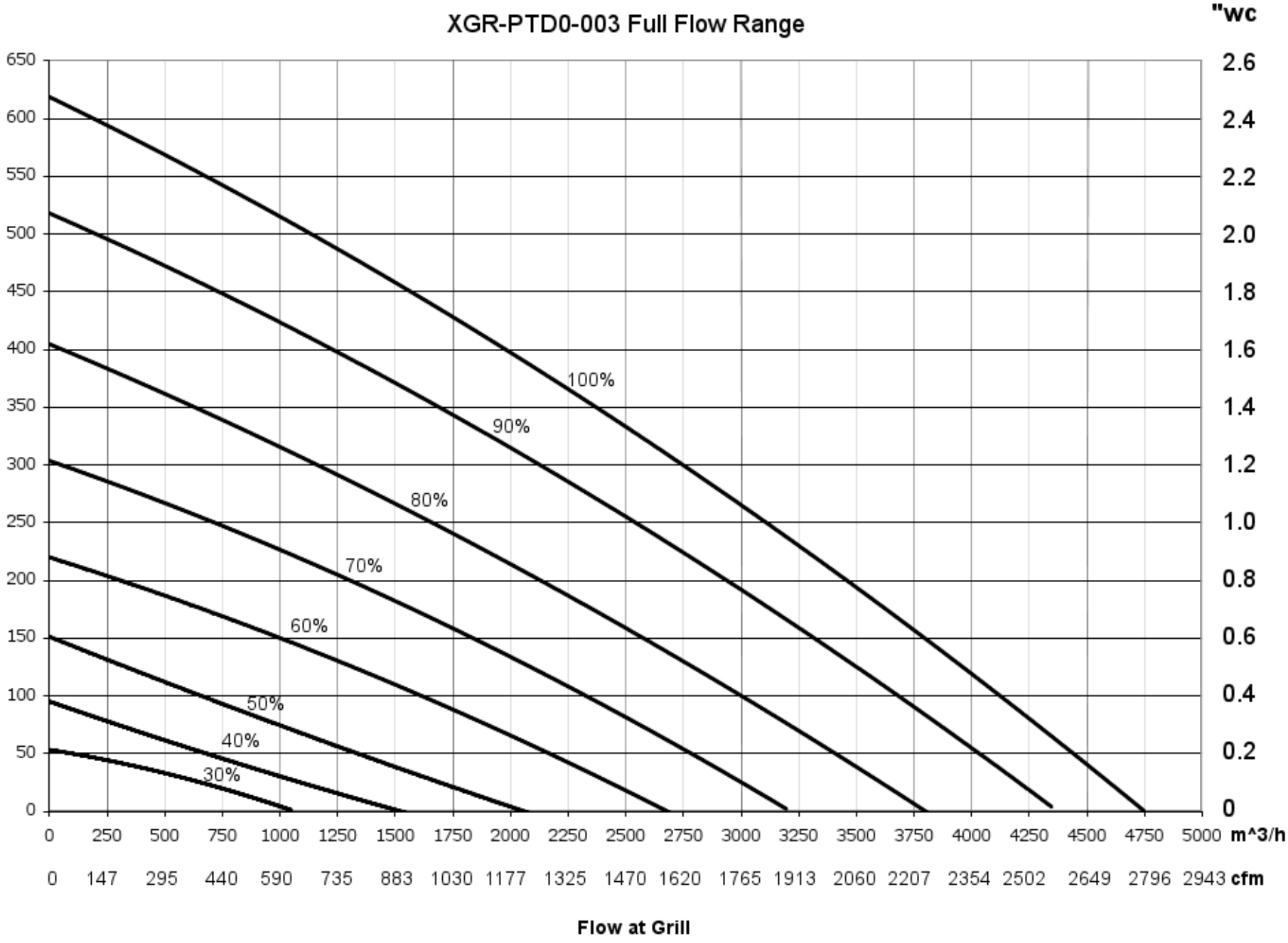


Room Pressurizer Flow



Room Pressurizer Flow

XGR-PTD0-003 Full Flow Range



3rd ANGLE PROJECTION

DIMENSIONS IN mm
DO NOT SCALE

UNSPECIFIED TOLERANCES: NO DEC PLACE ±0.5; 1 DEC PLACE ±0.2; 2 DEC PLACE ±0.1
FLATNESS TO BE LESS THAN 0.4mm OVER ANY 100mm LENGTH

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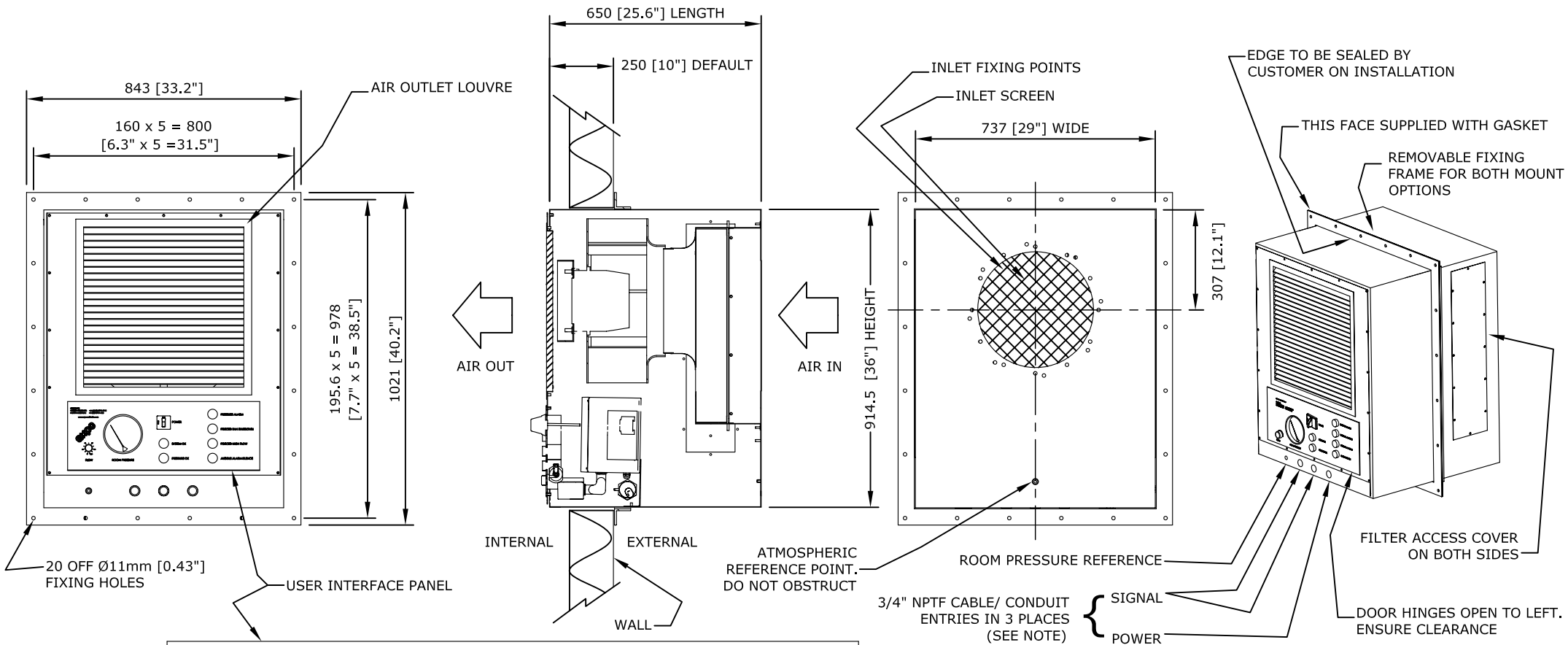

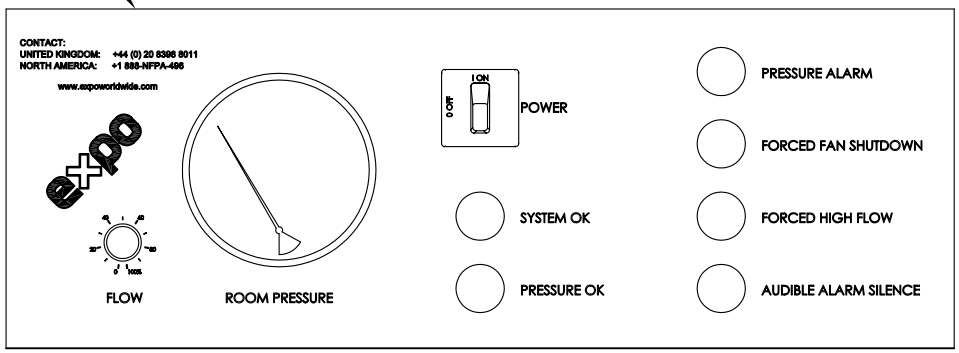

NOTES:

RECOMMENDED FINISHED THRU–WALL APERTURE
747W x 925H (29.4" x 36.4")

MINIMUM IP54 SEAL IS REQUIRED AT CONDUIT/CABLE ENTRIES.
SUITABLE GLANDS OR CONDUIT STOPPER BOX SHALL BE USED

APPROXIMATE WEIGHT 120kg [265lb]

APP'D	JPdB	ISSUE:	1	2		
CHK'D	SB	MOD. No:	DRAWN	4895		
DR'WN	FGM	DATE:	24/07/09	18/02/10		
		APPROVED:	JPdB	JPdB		
		DRAWING STATUS:				

MATERIAL: MILD STEEL 1.5mm THK

FINISH: POWDER COAT RAL7035 LIGHT GREY

Expo Technologies Limited SURREY KT7 0RH UNITED KINGDOM

TITLE: ROOM PRESSURIZER GENERAL ASSEMBLY

JOB No:

CUSTOMER:

SCALE: NTS

DRAWING No.: SYS-M000-032-GA

SHEET No. 1 OF 3

3rd ANGLE PROJECTION

DIMENSIONS IN mm
DO NOT SCALE

UNSPECIFIED TOLERANCES: NO DEC PLACE ±0.5; 1 DEC PLACE ±0.2; 2 DEC PLACE ±0.1
FLATNESS TO BE LESS THAN 0.4mm OVER ANY 100mm LENGTH

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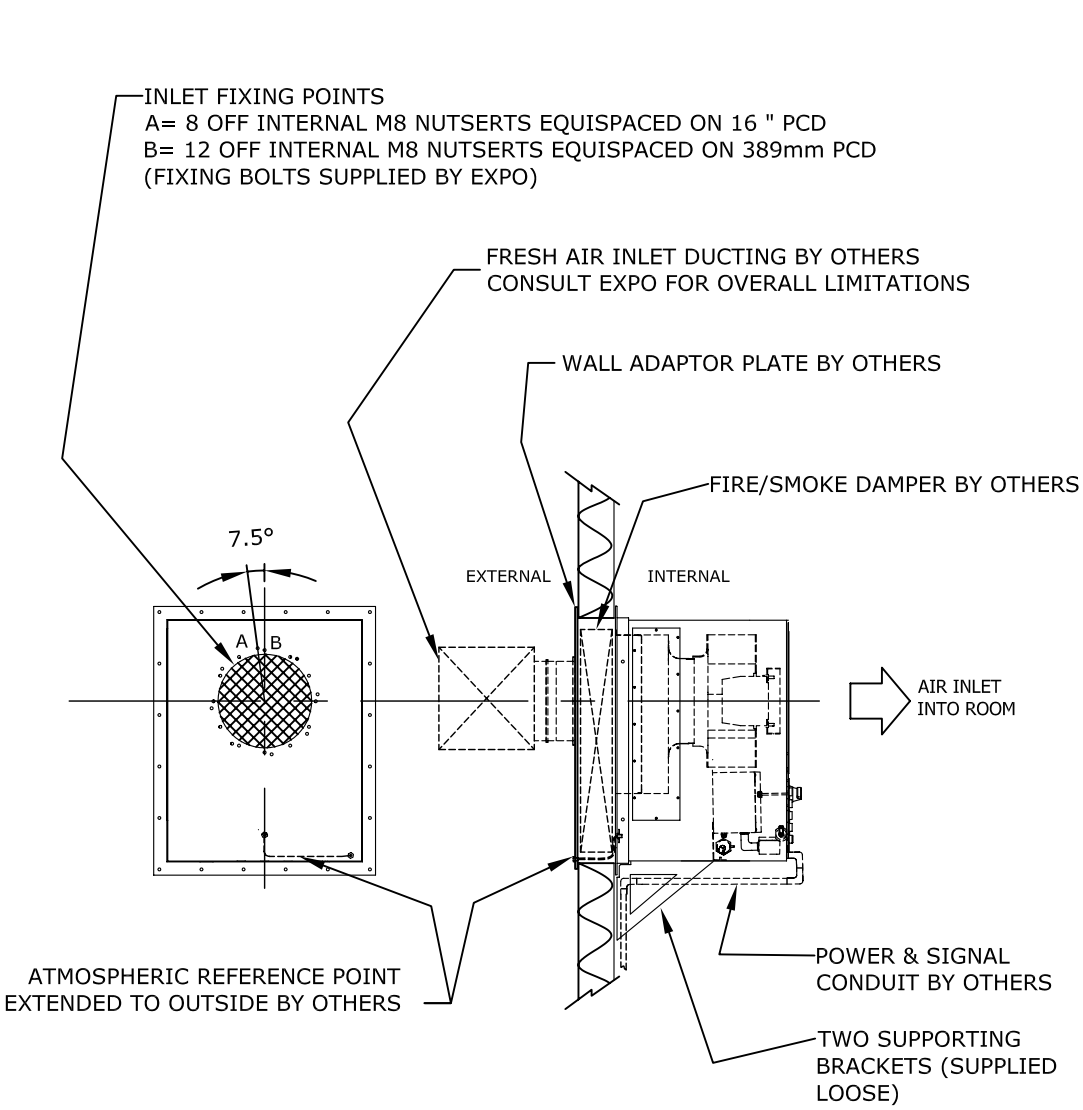
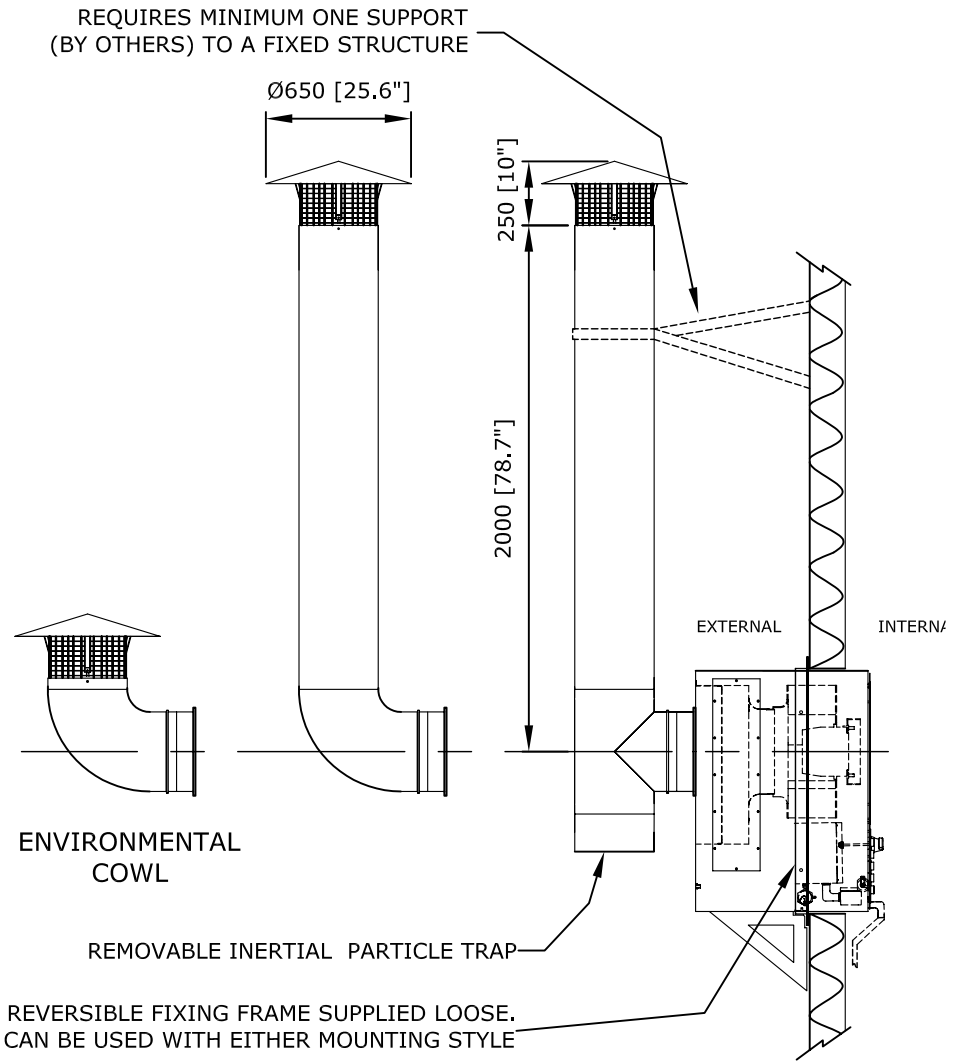


'IN-ROOM' MOUNT
SHOWN WITH NO INLET STACK



'THRU-WALL' MOUNT
SHOWN WITH 2m [6'7"] INLET STACK

APP'D	JPdB	ISSUE:	1	2		
		MOD. No:	DRAWN	4895		
CHK'D	SB	DATE:	24/07/09	18/02/10		
		APPROVED:	JPdB	JPdB		
DR'WN	FGM	DRAWING STATUS:				

MATERIAL: INLET TUBING MILD STEEL
FINISH: GALVANIZED

Expo Technologies Limited SURREY KT7 0RH UNITED KINGDOM

TITLE: ROOM PRESSURIZER INLET STACK OPTIONS

JOB No:

CUSTOMER:

SCALE: NTS

DRAWING No.: SYS-M000-032-GA

SHEET No. 2 OF 3

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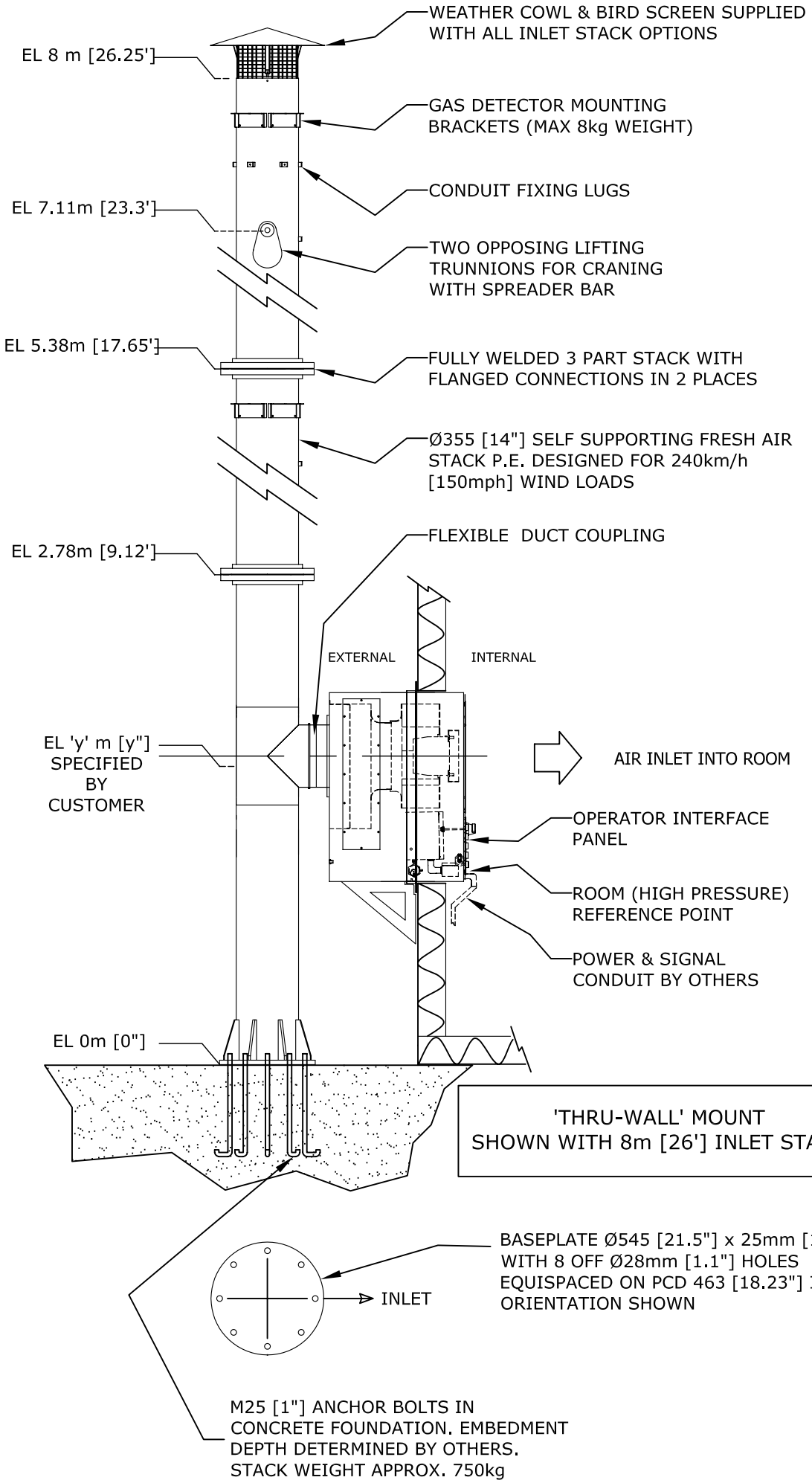
UNSPECIFIED TOLERANCES: NO DEC PLACE ±0.5, 1 DEC PLACE ±0.2, 2 DEC PLACE ±0.1
FLATNESS TO BE LESS THAN 0.4mm OVER ANY 100mm LENGTH

3rd ANGLE PROJECTION

DIMENSIONS IN mm
DO NOT SCALE


WEATHER COWL & BIRD SCREEN SUPPLIED WITH ALL INLET STACK OPTIONS
EL 8 m [26.25']
GAS DETECTOR MOUNTING BRACKETS (MAX 8kg WEIGHT)
CONDUIT FIXING LUGS
EL 7.11m [23.3']
TWO OPPOSING LIFTING TRUNNIONS FOR CRANING WITH SPREADER BAR
EL 5.38m [17.65']
FULLY WELDED 3 PART STACK WITH FLANGED CONNECTIONS IN 2 PLACES
Ø355 [14"] SELF SUPPORTING FRESH AIR STACK P.E. DESIGNED FOR 240km/h [150mph] WIND LOADS
EL 2.78m [9.12']
FLEXIBLE DUCT COUPLING
EXTERNAL
INTERNAL
EL 'y' m [y"] SPECIFIED BY CUSTOMER
AIR INLET INTO ROOM
OPERATOR INTERFACE PANEL
ROOM (HIGH PRESSURE) REFERENCE POINT
POWER & SIGNAL CONDUIT BY OTHERS
EL 0m [0"]
'THRU-WALL' MOUNT
SHOWN WITH 8m [26'] INLET STACK
BASEPLATE Ø545 [21.5"] x 25mm [1"] THICK WITH 8 OFF Ø28mm [1.1"] HOLES EQUISPACED ON PCD 463 [18.23"] IN ORIENTATION SHOWN
INLET
M25 [1"] ANCHOR BOLTS IN CONCRETE FOUNDATION. EMBEDMENT DEPTH DETERMINED BY OTHERS.
STACK WEIGHT APPROX. 750kg

APP'D	JPdB	ISSUE:	1	2	
CHK'D	SB	MOD. No:	DRAWN	4895	
DR'WN	FGM	DATE:	24/07/09	18/02/10	
		APPROVED:	JPdB	JPdB	
		DRAWING STATUS:			

MATERIAL: INLET TUBING MILD STEEL
FINISH: GALVANIZED

Expo Technologies Limited SURREY KT7 0RH UNITED KINGDOM

TITLE: ROOM PRESSURIZER 8m (26') INLET STACK

JOB No: CUSTOMER:

SCALE: NTS

DRAWING No. SYS-M000-032-GA

SHEET No. 3 OF 3

3rd ANGLE PROJECTION

DIMENSIONS IN mm
DO NOT SCALE

UNSPECIFIED TOLERANCES
NO DEC PLACE ±0.5
1 DEC PLACE ±0.2
2 DEC PLACE ±0.1
FLATNESS TO BE LESS THAN 0.4mm OVER ANY 100mm LENGTH

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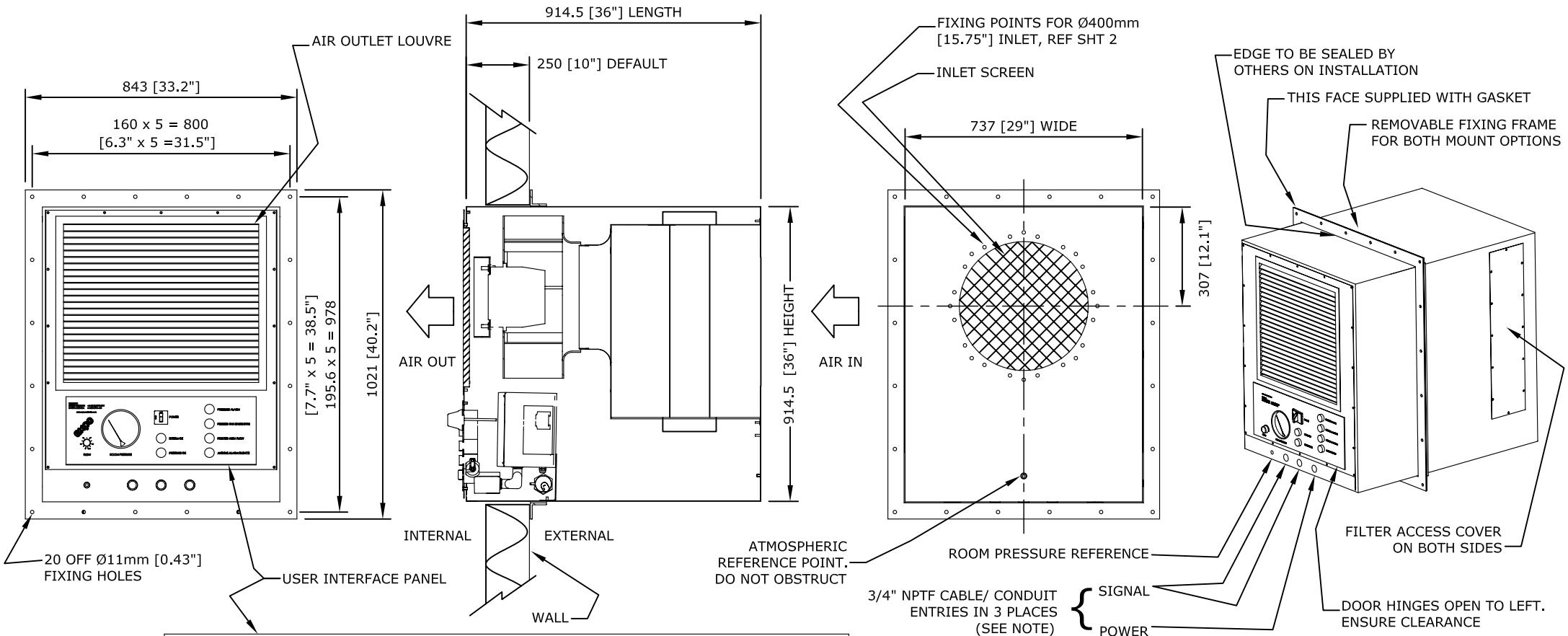

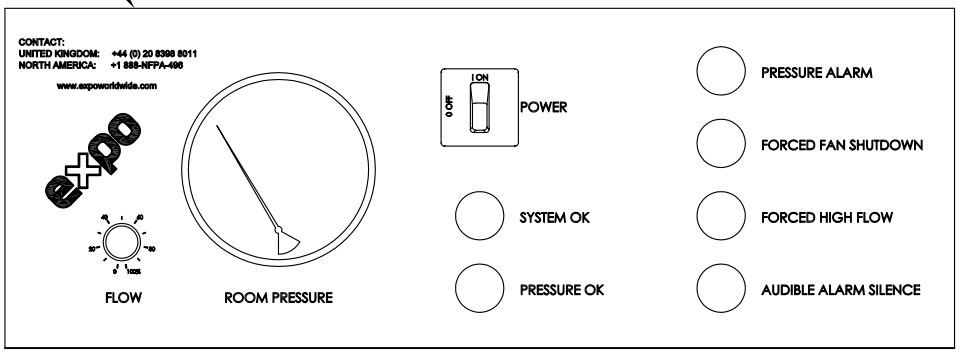

NOTES:

RECOMMENDED FINISHED THRU–WALL APERTURE
747W x 925H (29.4" x 36.4")

MINIMUM IP54 SEAL IS REQUIRED AT CONDUIT/CABLE ENTRIES.
SUITABLE GLANDS OR CONDUIT STOPPER BOX SHALL BE USED

APPROXIMATE WEIGHT 140kg [309lb]

APP'D	JPdB	ISSUE:	1			
CHK'D	SB	MOD. No:	DRAWN			
DR'WN	FGM	DATE:	24/07/10			
		APPROVED:	JPdB			
		DRAWING STATUS:				

MATERIAL: MILD STEEL 1.5mm THK

FINISH: POWDER COAT RAL7035 LIGHT GREY

Expo Technologies Limited SURREY KT7 0RH UNITED KINGDOM

TITLE: 2 DOOR ROOM PRESSURIZER

JOB No:

CUSTOMER:

SCALE: NTS

DRAWING No.: SYS-M000-035-GA

SHEET No. 1 OF 2

3rd ANGLE PROJECTION

DIMENSIONS IN mm
DO NOT SCALE

UNSPECIFIED TOLERANCES: NO DEC PLACE ±0.5; 1 DEC PLACE ±0.2; 2 DEC PLACE ±0.1
FLATNESS TO BE LESS THAN 0.4mm OVER ANY 100mm LENGTH

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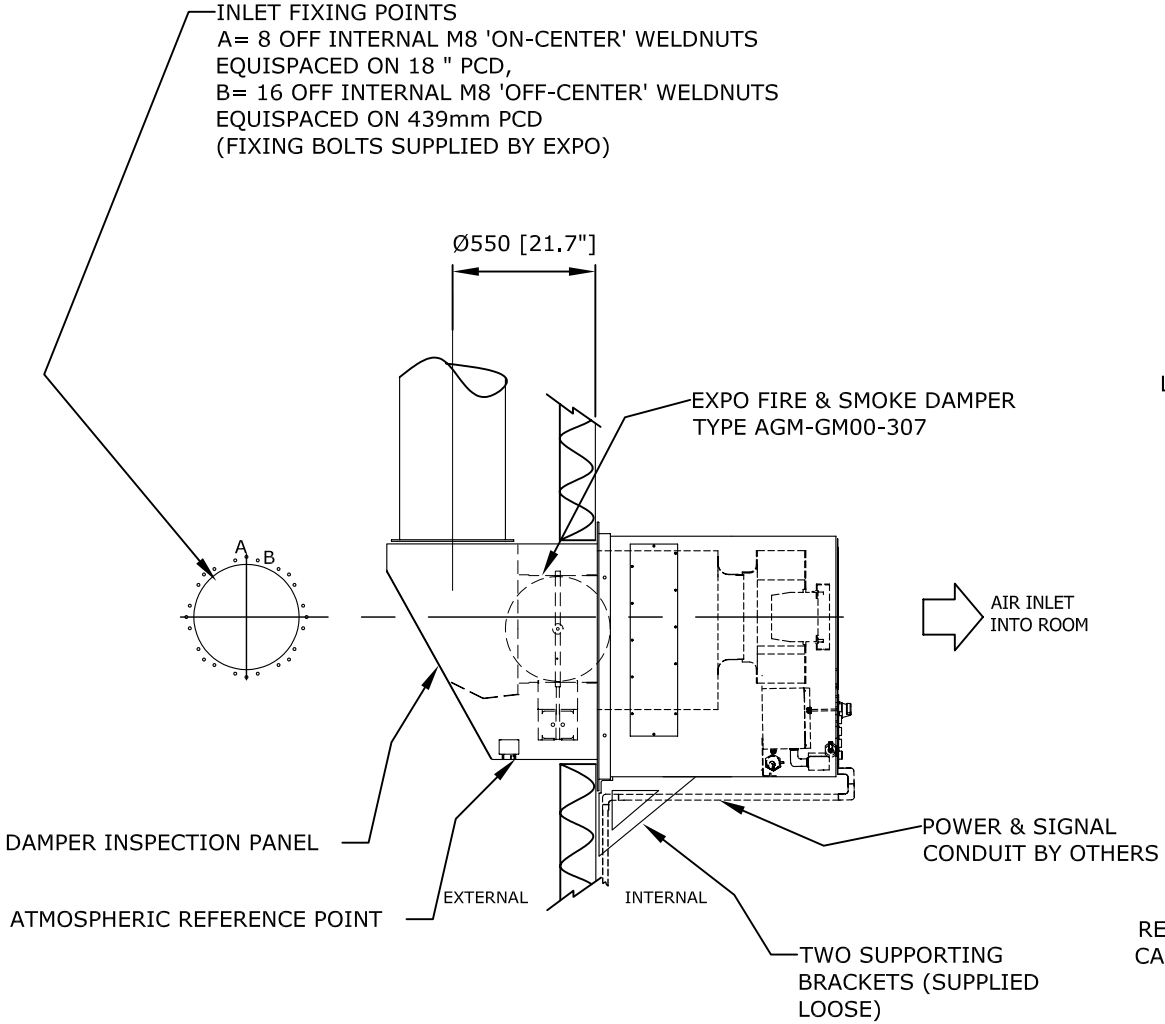
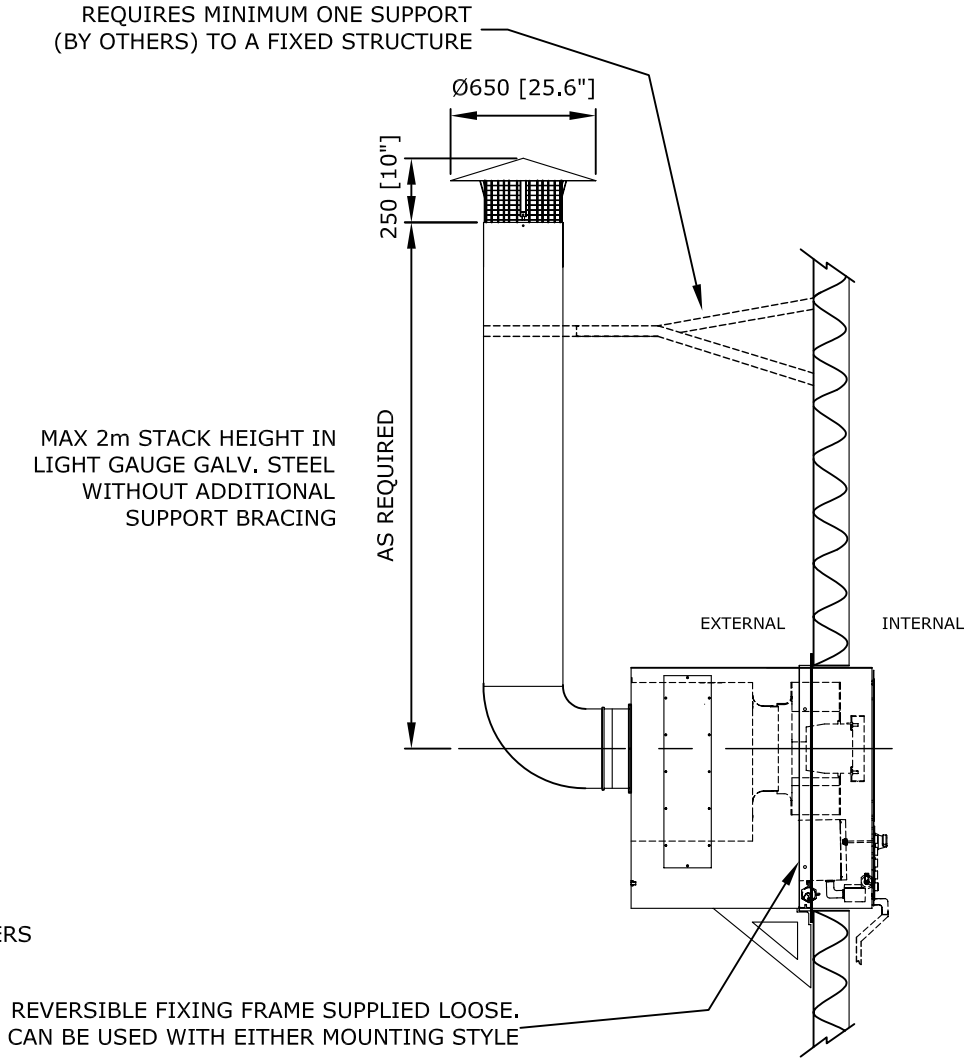


'IN-ROOM' MOUNT SHOWN
WITH OPTIONAL DAMPER



'THRU-WALL' MOUNT
SHOWN WITH INLET STACK

APP'D	JPdB	ISSUE:	1				
		MOD. No:	DRAWN				
CHK'D	SB	DATE:	24/07/10				
		APPROVED:	JPdB				
DR'WN	FGM	DRAWING STATUS:					

MATERIAL: INLET TUBING MILD STEEL
FINISH: GALVANIZED

Expo Technologies Limited SURREY KT7 0RH UNITED KINGDOM

TITLE: ROOM PRESSURIZER INLET STACK OPTIONS

JOB No:

CUSTOMER:

SCALE: NTS

DRAWING No.: SYS-M000-035-GA

SHEET No. 2 OF 2

3rd ANGLE PROJECTION

DIMENSIONS IN mm
DO NOT SCALE

UNSPECIFIED TOLERANCES: NO DEC PLACE ±0.5; 1 DEC PLACE ±0.2; 2 DEC PLACE ±0.1
FLATNESS TO BE LESS THAN 0.4mm OVER ANY 100mm LENGTH

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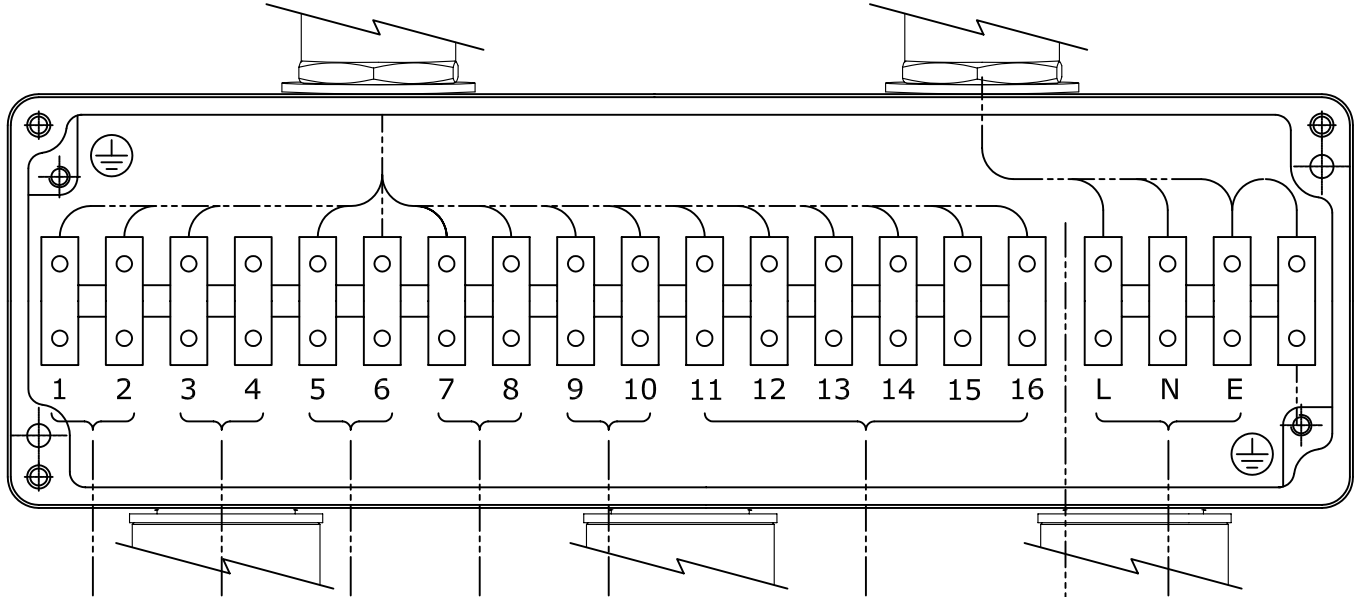
SIGNAL
TO CONTROL ENCLOSURE

POWER
TO CONTROL ENCLOSURE



FIELD ENTRY: SIGNALS

FIELD ENTRY: POWER

- 1 2 — NORMALLY OPEN (VOLT FREE) CLOSED = AUDIBLE ALARM
- 3 4 — NORMALLY OPEN (VOLT FREE) CLOSED = PRESSURE ALARM
- 5 6 — NORMALLY OPEN (VOLT FREE) CLOSED = SYSTEM HEALTHY
- 7 8 — NORMALLY CLOSED (VOLT FREE) OPEN TO SHUTDOWN
- 9 10 — NORMALLY OPEN (VOLT FREE) CLOSE FOR HIGH FLOW
- 11 12 13 14 15 16 — SPARE
- L N E — USER'S POWER INPUT

SYSTEM OUTPUTS

USER INPUTS

MINIMUM RECOMMENDED WIRE SIZE:
POWER:2.5mm^2 (14AWG)
SIGNAL:0.5mm^2 (20AWG)

APP'D	JPdB	ISSUE:	1	2			MATERIAL
CHK'D	MP	MOD. No:	DRAWN	4895			
DR'WN	FGM	DATE:	29/09/09	18/02/10			FINISH
		APPROVED:	JPdB	JPdB			
		DRAWING STATUS: CERT RELATED					

Expo Technologies Limited SURREY KT7 0RH UNITED KINGDOM

TITLE: ELECTRICAL TERMINATION BOX

JOB No:

CUSTOMER:

SCALE: -

DRAWING No. SD7833

SHEET No. 1 OF 1

3rd ANGLE PROJECTION

DIMENSIONS IN mm
DO NOT SCALE

UNSPECIFIED TOLERANCES
NO DEC PLACE ±0.5
1 DEC PLACE ±0.2
2 DEC PLACE ±0.1
FLATNESS TO BE LESS THAN 0.4mm OVER ANY 100mm LENGTH

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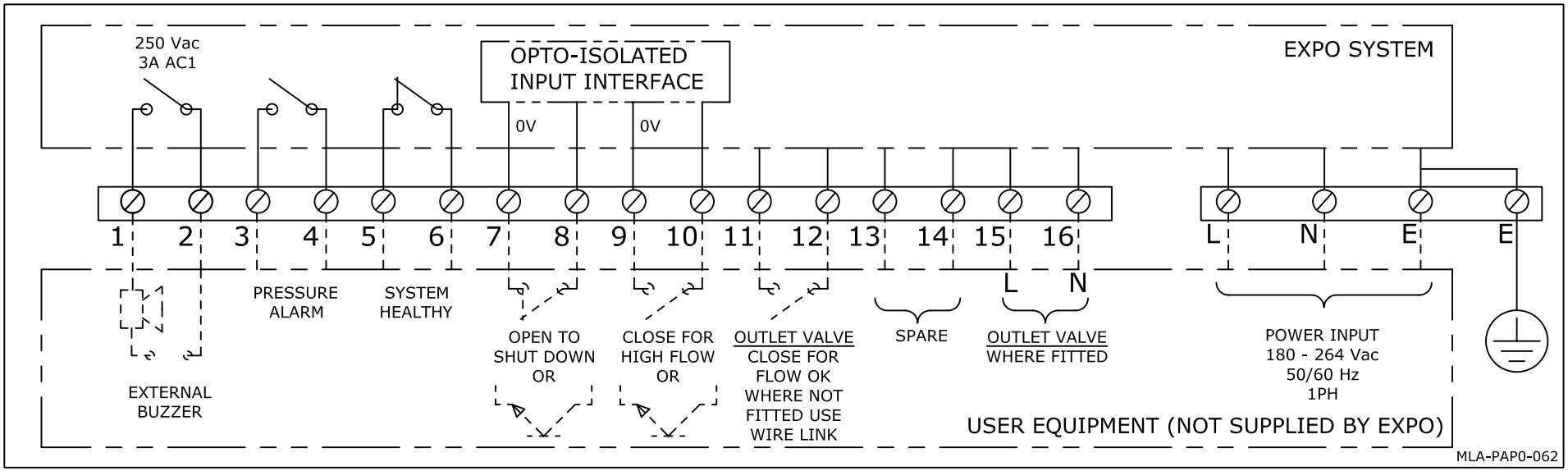

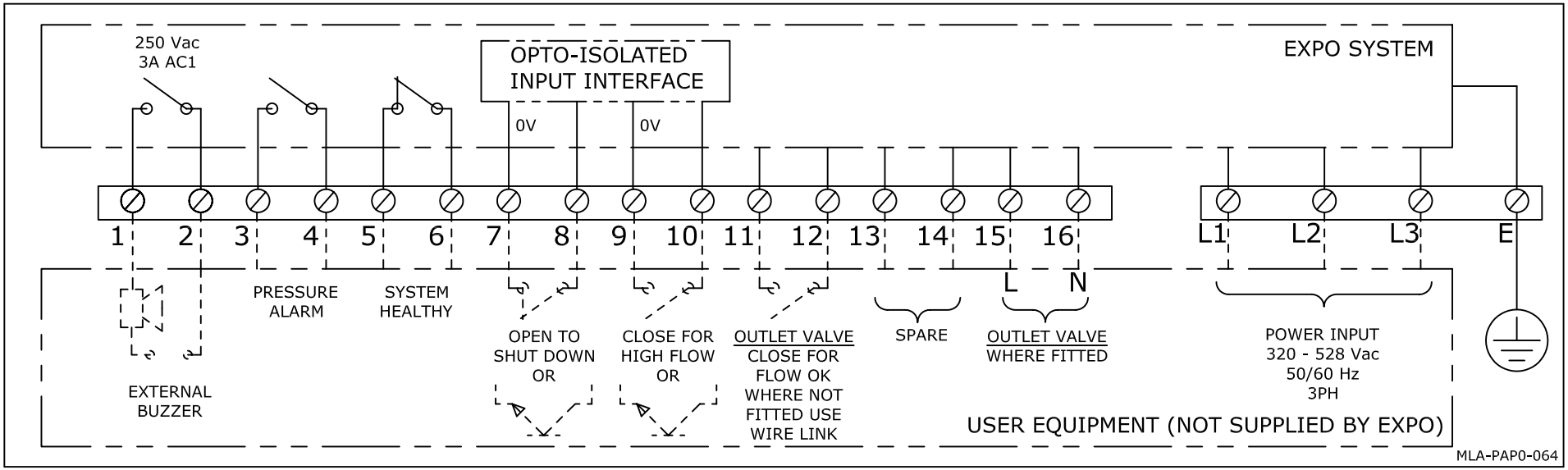

APP'D	JPdB	ISSUE:	1	2	3	
CHK'D	MP	MOD. No:	DRAWN	4895	4999	
DR'WN	FGM	DATE:	29/09/09	18/02/10	06/08/10	
		APPROVED:	JPdB	JPdB	JPdB	
		DRAWING STATUS: CERT RELATED				

MATERIAL
MATALISED POLYESTER

FINISH

Expo Technologies Limited SURREY KT7 0RH UNITED KINGDOM

TITLE
TERMINAL BOX LABEL (INTERNAL)

JOB No:

CUSTOMER:

SCALE
-

DRAWING No.
MLA-PAP0-062

SHEET No. 1 OF 1

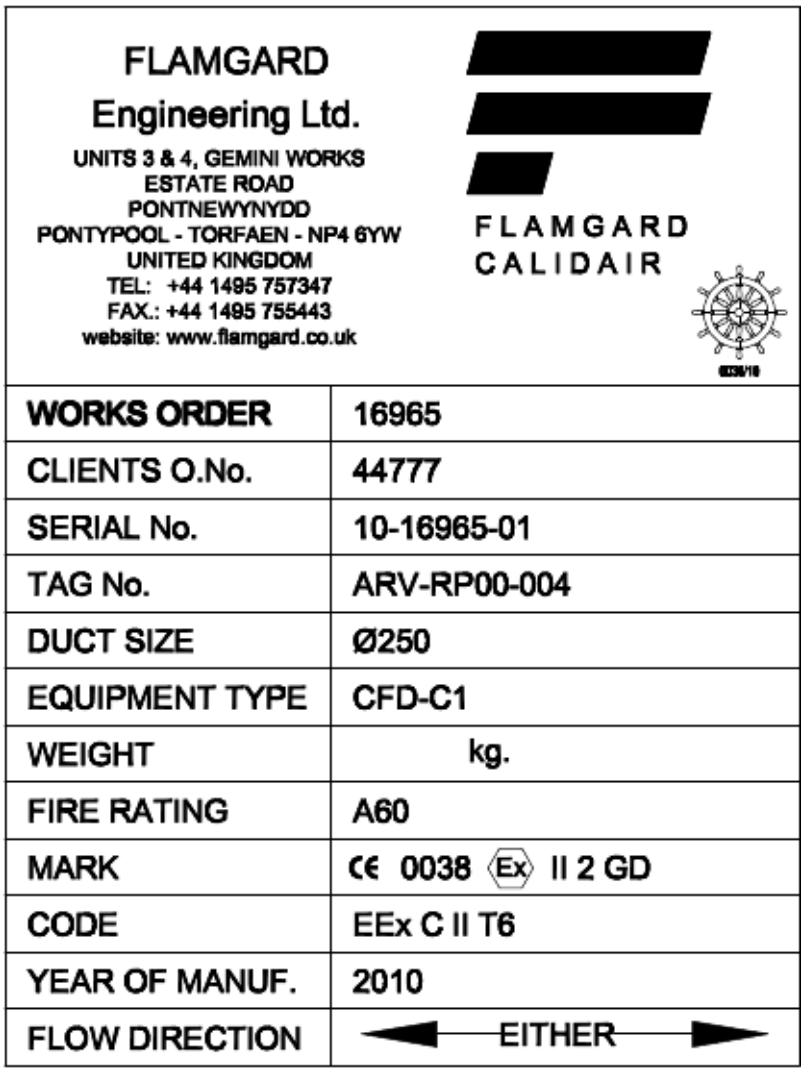

Figure.3 Fire and Smoke Damper Label (where fitted)

12 Certificates of Certification

The following certificates are attached:

Title	Certificate Number	Sheet(s)
Fan Motor Certificate	PTB08ATEX 3062	4 of 4
Room Pressurizer System Certificate		1 of 1
Declaration of Conformity		1 of 1
Fire and Smoke Damper Certificate (where fitted)	SASF080134	2 of 2
Actuator Certificate (where fitted)	PTB-04ATEX 2106	3 of 3
Fire Sensor Certificate (where fitted)	PTB 10 ATEX 2006	3 of 3
Junction Box Certificate (where fitted)	SIRA99ATEX3173	6 of 6

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

(1) # EC-TYPE-EXAMINATION CERTIFICATE

(Translation)

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-type-examination Certificate Number:

PTB 08 ATEX 3062

(4) Equipment: Three-phase external-rotor motors type MK 137-...

(5) Manufacturer: Ziehl-Abegg AG

(6) Address: Heinz-Ziehl-Straße
74653 Künzelsau, Germany

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report PTB Ex 08-38197.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0:2006 **EN60079-7:2007**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

II 2 G Ex e II T1, T2, T3 or T4

Zertifizierungssektor Explosionsschutz
By order:

Dr.-Ing. F. Lienesch
Regierungsdirektor

Braunschweig, November 13, 2008

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT

EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt.
In case of dispute, the German text shall prevail.

(13) # SCHEDULE

(14) ## EC-TYPE-EXAMINATION CERTIFICATE PTB 08 ATEX 3062

(15) Description of equipment

The three-phase motors, which are designed as external-rotor motors, have Increased Safety "e" type of protection.

The stator flange with the stator bush is made from die cast aluminium.

The rotor is made from die cast aluminium with potted shaft or with steel bush which is to accommodate the shaft. The rotor can be provided with unsealed condensed-water drains.

The rotor shaft rotates in for-life-lubricated rolling bearings that are closed at both ends. The bearing cap is made from steel or plastics.

The motors have IP44 degree of protection of enclosure.

The winding coils may be equipped with PTC thermistor detectors in compliance with standard DIN 44082. PTC thermistor detectors may be used as the only motor protection if they are connected to a tripping unit function-tested in compliance with Directive 94/9/EC (marked II (2) G) and the data sheet for the electrical rating shows this option.

The supply lead, which is connected to the winding ends directly in the winding overhang, is brought out through cable glands that have been approved on the basis of Directive 94/9/EC.

The motors are only used to drive axial and radial fans with axial air intake. Cooling is achieved by heat exchange, using the convection current of the transported medium and the motor enclosure.

The ambient temperature range is 40°C to –20 °C. This range may be increased up to 60 °C by special electrical or thermal design features, using suitable materials and components, or by the data sheet for the electrical rating.

The electrical motor data, and the data for equipment providing for safe operation, including specifications for compliance with the temperature class, are defined in a data sheet that forms part of the EC type-examination certificate.

(16) Test report PTB Ex 08-38197

(17) Special conditions for safe use

None

EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt.
In case of dispute, the German text shall prevail.

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • D-38116 Braunschweig

Conditions for manufacturing, installation and operation

If the non-closed lead ends are connected to the outer electric circuits within the potentially explosive area, a suitable terminal box has to be used for which a separate certificate has been issued and which carries an explosion protection mark of its own. The connecting lead must be installed to provide for permanent wiring.

In connection with condensed-water boreholes, which are not closed during operation, the external-rotor motors must be installed with fan blades and fan housing.

To ensure IP44 degree of protection of enclosure, the motors must be provided with fan blades and they must be installed in the fan housing.

The temperature of the conveyed medium must not reach values beyond the temperature range specified in this certificate and accepted as ambient and cooling-medium temperature.

(18) Essential health and safety requirements

met by compliance with the harmonised standards mentioned above

Zertifizierungssektor Explosionsschutz
By order:

Braunschweig, November 13, 2008

Dr.-Ing. F. Lienesch
Regierungsdirektor

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Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

DATA SHEET 01 TO EC-TYPE-EXAMINATION CERTIFICATE PTB 08 ATEX 3062

Manufacturer: **Ziehl-Abegg AG, 74653 Künzelsau, Germany**

for the three-phase asynchronmotor type series MK 137-4DK.10.Y (fan drive)

Ratings

This certificate is valid for the following designs providing the motors of this type differ only negligibly from the sample tested as regards the electrical and thermal stresses:

Power (input):			1.3			kW
Voltage:	100	230	400	500	690	V
Current:	9.3	4.05	2.35	1.87	1.35	A
Power factor:			0.81			
Frequency:			50			Hz
Speed: (motor)			1330			min^{-1}
Duty Type:			S1			
I_A/I_N ratio:			4.1			
Thermal class:			F			

In addition to the above-mentioned voltages, intermediate values are also permissible. The associated currents are to be converted in the inverse ratio to the voltages. The mains voltage may vary by up to ± 5% and the mains frequency by up to ± 2% from the rated values, in keeping with range A according to IEC 60034-1.

Temperature monitoring

If embedded temperature sensors (PTC thermistors DIN 44082-M130) are used together with a control unit tested for its function in accordance with directive 94/9/EC, the requirements of EN 60079-7, subclause 4.7.4 are also met for motors in the locked-rotor condition up to **temperature class T3**. At rated voltage and starting from the cold state (20°C), the tripping time will be t_A = 85 s.

Owing to the matched protective device, the data of the heating time t_E can be dispensed with.

Operation at reduced voltage

From 25% of the rated voltage, the motors may also be operated as fan drive at reduced voltage using a three-phase a. c. controller. The motor current may exceed the rated value by up to 9%.

From 15% of the rated voltage, the motors may also be operated as fan drive at reduced voltage using a transformer. The motor current may exceed the rated value by up to 9%.

Report PTB Ex 03-33440

Zertifizierungssektor Explosionsschutz
By order

Dr.-Ing. F. Lienesch
Regierungsdirektor

Braunschweig, November 13, 2008

(1) **Declaration of Conformity.**

(2) Expo Technologies Document Number EXPO 09MDoC1148X Issue 2

(3) This declaration is issued for the electrical apparatus:

Expo Room Pressurizing System types RPx-xxxx-xxx

(4) Manufacturers:

Expo Technologies
Unit 2 The Summit
Hanworth Road
Sunbury on Thames
TW16 5DB

(5) This electrical apparatus and any acceptable variation thereto is specified in the Annex to this certificate and the documents therein referred to.

(6) This declaration and schedule confirms compliance of each unit with the following standards:

EN 60079-0: 2006	General requirements
60079-13: Ed.1/CDV	Pressurized rooms “p”
EN 60079-15: 2005	Protection type “n”

(7) This apparatus fulfils all the requirements for Group II Category 3 equipment in accordance with European Directive 94/9/EC.

(8) The design is documented in Expo Technologies Technical Construction File number 41017 and within certificate record no SC22

(9) The apparatus marking:

Ex nA nL nR [pz] IIB T4 Gc **II 3 G**

For and on behalf of Expo Technologies Ltd.
Sunbury on Thames, 02 March 2015.

Asabi Adeboye
Certification Engineer

Martin Hodgson
Senior Consultant

Annex to Declaration of Conformity EXPO 09MDoC1148X

10 Description:
A range of pressurizing and ventilation systems for rooms comprising a fan or combinations of fans, an Ex nR protected System Control Enclosure with local and remote inputs and outputs for interfacing with the integrated room protection system. Interfaces are provided where required for fire & gas detectors, outlet valves, fire dampers and other associated equipment. All user interfaces are via an Ex nA Electrical Terminal Box

11 System data:

Power Supply	180- 264 Vac 1 Phase 50/60Hz 320- 528 Vac 3 Phase 50/60Hz
Air Flow (set by user) range between	50m^3/hr to 5500m^3/hr
Minimum over-pressure	25Pa
Maximum over-pressure	650Pa
Ambient temperature range	–20 °C to + 40 °C.

12 Special conditions of safe use:

Cable glands to the Electrical Terminal Box shall be a minimum of IP54 and be type Ex e or d and shall be installed in accordance with the gland certificate. Alternatively conduit stopper boxes may be used providing that the IP rating is maintained.

The System Control Enclosure is protected by restricted breathing measures. If opened the integrity of the protection shall be confirmed by testing the leakage rate as described in the manual for the apparatus. A record of the re-testing shall be maintained and the enclosure be marked to indicate when the testing took place. Failure to carry out the test and record the results will invalidate this certificate

13 Documentation

Title	Drawing no	Rev
Room Pressurizer GA (single)	SYS-M000-032-GA	2
Room Pressurizer GA (dual)	SYS-M000-033-GA	2
Room Pressurizer GA (single 2 door)	SYS-M000-035-GA	1
Electrical Terminal Box	SD7833	3
System Control Enclosure	SD7911	1
System Manual (single)	ML478	6
System Manual (dual)	ML490	5

Note the manual revisions are subject to change without notification

Annex to Declaration of Conformity EXPO 09MDoC1148X

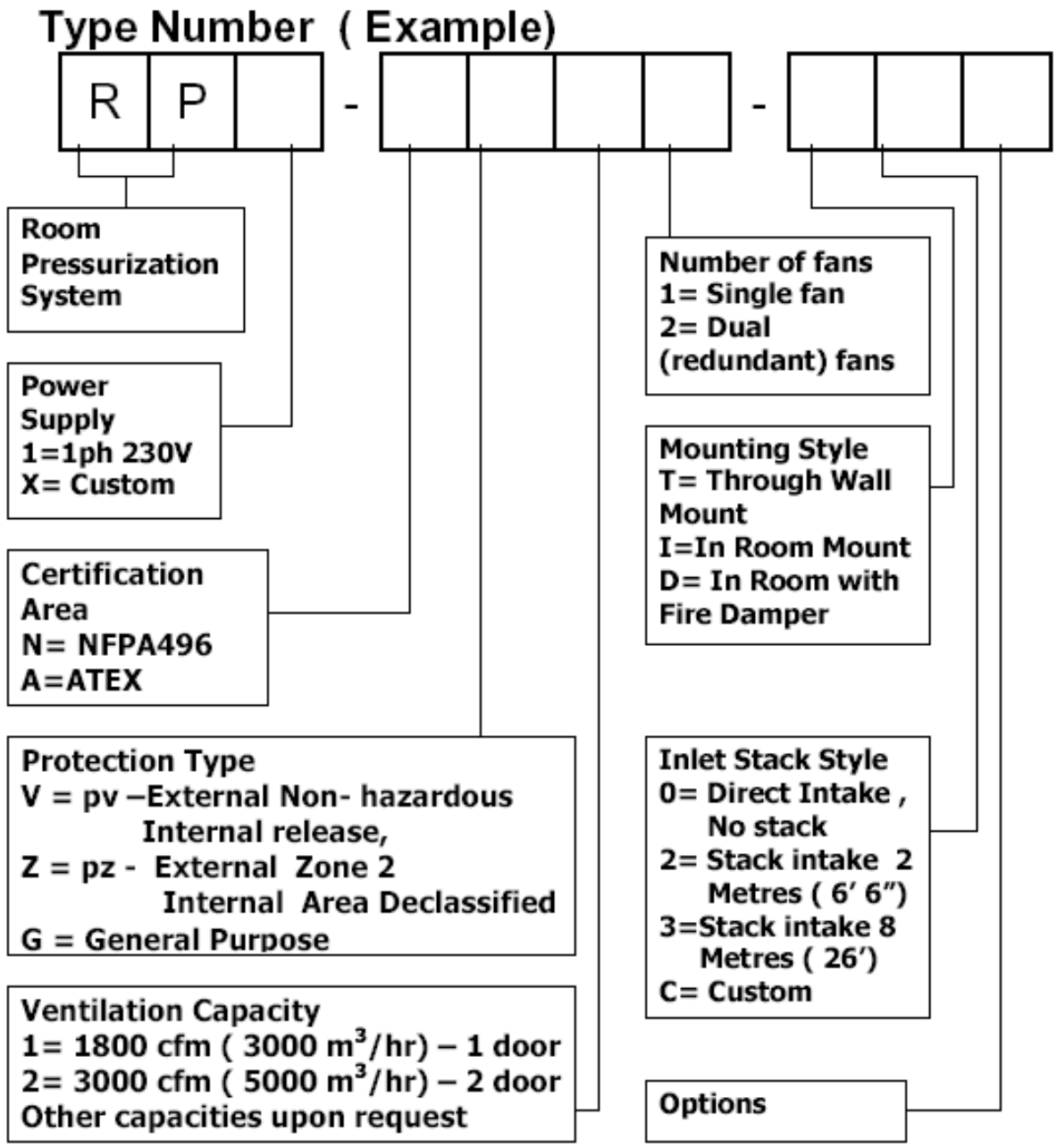
Variation 1

Variation 1 of the certificate is issued to include the 2 fan, 2 door model of Room Pressurizing System –new drawings added.
Schedule drawings listed on Issue 0 of the certificate have been updated or replaced as follows:

Title	Issue 0 Drawing no	Rev	Issue 1 Drawing no	Rev	Sheets
Room Pressurizer (1 fan, 1 door)	SYS-M000-032-GA	2	SD7929	1	1 of 1
Room Pressurizer (2 fan, 1 door)	SYS-M000-033-GA	2	SD7930	1	1 of 1
Room Pressurizer (1 fan, 2 door)	SYS-M000-035-GA	1	SD7931	1	1 of 1
Room Pressurizer (2 fan, 2 door)			SD7932	1	1 of 1
Interconnection Diagram			SD7937	1	1 of 1
Numbering System			SD7938	1	1 of 1
Electrical Terminal Box	SD7833	3	SD7935	1	1 of 1
System Control Enclosure	SD7911	1	SD7911	1	5 of 5
System Manual (single fan)	ML478	6	ML478	6	-
System Manual (dual fan)	ML490	5	ML490	5	-

Note the manual revisions are subject to change without notification

Product Description



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TW16 5DB

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Fax **+ 44 (0) 20 8398 8014**
E-mail: **sales@expoworldwide.com**

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